2:15

758-2 Comparison of Electron Beam Tomography and Conventional Risk Factors in the Prediction of Coronary Artery Disease

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The predictive power of electron beam tomography and conventional risk factors for coronary artery disease (CAD) was analyzed by multiple logistic regression in 259 adults (186 men, 73 women) undergoing cardiac catheterization for clinical indications. Patients with previously documented CAD (prior MI, CABG, PTCA, or cath) were excluded from analysis.

Mean age was 60 ± 9 years, mean total cholesterol was 217 ± 40 mg/dl, and the ratio of total cholesterol to HDL cholesterol was 5.8 ± 1.7. 137 patients had obstructive CAD (worst stenosis ≥ 50%), 54 patients had nonobstructive CAD, and 68 patients had normal coronary arteries.

Coronary calcium score (mean 516 ± 851, Agatston method) was highly predictive of the presence of any CAD or obstructive CAD ($p < 0.0001$). Obstructive CAD was also associated with diabetes ($p < 0.001$), the ratio of total cholesterol to HDL cholesterol ($p = 0.002$) and HDL < 35 ($p < 0.01$). Although the severity of CAD was related to the total number of lipid and nonlipid risk factors, the NCEP criteria for drug therapy of elevated cholesterol did not reliably predict severity of disease. In patients meeting or not meeting criteria for treatment, worst stenosis in any major segment was 55 ± 40% vs 50 ± 41% ($p = 0.30$).

In patients with chest pain or exertional dyspnea, coronary calcium is highly predictive of presence and severity of CAD. Diabetes, total cholesterol/HDL, HDL cholesterol and total number of risk factors are also associated with obstructive disease, but the NCEP guidelines do not distinguish between those with and without obstructive disease.

2:30

758-3 Arterial Calcification Is Inversely Related to Serum Vitamin D in Familial Hypercholesterolemia Patients

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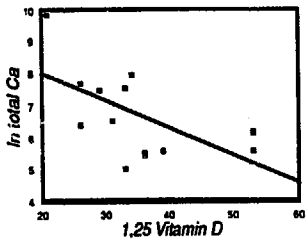
Calcification is a key component of atherosclerosis, and emerging evidence suggests similarities with skeletal osteogenesis. In addition, arterial calcification has recently been shown to occur at an early age in patients with familial hypercholesterolemia (FH). To study our hypothesis of parallel mechanisms between arterial calcification and osteogenesis, we evaluated homozygous FH patients for associations between arterial calcification and serum levels of various osteoregulatory molecules. Bivariate regression analyses were performed on 13 FH subjects (13–53 y.o.) who underwent ultrafast CT scans to measure extent of arterial calcification as well as biochemical analysis of serum. Total cholesterol, HDL, LDL, and 1.25 dihydroxyvitamin D3 (vitamin D) were obtained on all subjects; osteocalcin and parathyroid hormone (PTH) levels were obtained on a subset.

Results: Unexpectedly, serum vitamin D was *negatively* correlated with arterial calcification ($r = -0.60$; $p = 0.04$); figure. Total cholesterol was positively associated with calcification ($r = 0.68$, $p < 0.01$) as previously reported; LDL cholesterol was positively associated as well ($r = 0.67$, $p < 0.01$). No significant correlation was seen with HDL, osteocalcin or PTH.



Conclusion: Total and LDL cholesterol may have a positive role in calcification of atherosclerotic plaques, whereas vitamin D may be counteractive. Involvement of the bone regulatory factor vitamin D in calcified atherosclerosis offers a possible mechanistic link between skeletal and arterial calcification, with potential implications for the systemic treatment of disorders such as osteoporosis.

2:45

758-4 Comparison of Thallium Stress Testing and Electron Beam Tomography in the Prediction of Coronary Artery Disease

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The accuracy of thallium stress tests, performed at multiple hospitals/private laboratories, and electron beam tomography (EBT) of the coronary arteries was compared in 150 patients undergoing coronary arteriography for clinical indications. Patients with previously diagnosed coronary disease (cath, MI, CABG, or PTCA) were excluded from analysis.

Average age was 61 ± 9 years, 74% were men, and mean ± SD (25, 50, 75 %iles) calcium score (Agatston method) were 517 ± 871 (15, 133, 651). Overall accuracy of the thallium stress tests was 0.63, compared to 0.79 for the calcium score. Relative risk of obstructive CAD for an abnormal thallium stress test was 3.5 ($p = 0.01$), vs 14.9 ($p = 0.0001$) for the calcium score. The combination of an abnormal stress test and elevated calcium score yielded an odds ratio of 15.8 ($p < 0.001$ vs stress test only). Only 2/8 patients with abnormal thallium stress tests and calcium score of zero had obstructive CAD.

In the detection of obstructive CAD in symptomatic patients, EBT of the coronary arteries is at least as accurate as thallium stress testing performed in a community setting, and the combination is superior to thallium stress testing alone.

3:00

758-5 19 Month Follow-up of 1183 Asymptomatic Adults Undergoing Electron Beam Tomography (EBT) of the Coronary Arteries

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Estimates of coronary artery calcium content by EBT correlate with severity of coronary disease in symptomatic and asymptomatic populations, but follow-up is scanty. We therefore obtained follow-up on 1183/1185 asymptomatic adults (99.8%) who underwent scanning between Sept. 1, 1993 and March 11, 1994 (mean = 19 mos).

Mean age was 53 ± 11 yrs, and 71% of the subjects were men. Mean calcium score (Agatston method) was 157 ± 471 (median 4).

There were 3 deaths (one cardiac), 9 nonfatal MI's, 2 strokes, 10 CABG's, and 9 PTCA's in 26 subjects (cardiovascular event rate = 2.0%). Mean calcium score was 973 ± 1199 among those with events vs 140 ± 426 vs those without cardiovascular events ($p = 0.002$).

For calcium scores of ≥ 100 and ≥ 680 (corresponding to 20% and 50% stenoses in major coronary segments) and ≥ 157 (the mean for the sample), sensitivity, specificity, positive and negative predictive value and odds ratio were:

Score	SENS	SPEC	PPV	NPV	OR	P
≥ 100	0.04	0.76	0.071	0.995	16.9	< 0.00001
≥ 157	0.84	0.82	0.089	0.995	23.2	< 0.00001
≥ 680	0.48	0.95	0.182	0.988	18.9	< 0.00001

EBT of the coronary arteries predicts cardiovascular events over the short term.

3:15

758-6 Coronary Calcium Assessment by Electron Beam Tomography Forecasts Acute Complications of Angioplasty

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Traumatic vessel dissection and/or closure (DIS) are rare but sometimes catastrophic complications of coronary angioplasty (PTCA). We tested the *hypothesis* that coronary artery calcium assessment (CAC) by electron beam tomography can stratify PTCA patients with regard to risk of DIS. Twenty-five patients (16 male, age 55 ± 3 [SE]) underwent electron beam tomography-CAC prior to PTCA (3 mm slices, threshold: 130 Hounsfield units, AREA = mm^2 > threshold, Score = density-weighted AREA). All were angiographically classified as "not low risk", based on AHA/ACC lesion classification ≥ B1. *Results:* 3/8 patients with the highest total CAC (AREA = 346 ± 238 mm^2, Score = 1226 ± 238) suffered flow-limiting DIS compared to 1/9 patients with medium CAC (AREA = 69 ± 14 mm^2, Score = 222 ± 52) and 0/9 patients with low CAC (AREA = 9 ± 3 mm^2, Score = 13 ± 5). Patients with DIS had much more CAC (AREA = 302 ± 42 mm^2, Score = 1095 ± 170, N = 4) than patients with uncomplicated PTCA (AREA = 106 ± 35, Score = 358 ± 126 N = 21,